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INTERSTELLAR PROBE USING A SOLAR SAIL: CONCEPTUAL DESIGN AND TECHNOLOGIES

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Sending a spacecraft beyond the heliopause to begin the exploration of our local galactic neighborhood will be one of the grand scientific enterprises of the next century. NASA's Interstellar Probe will be the first spacecraft designed to explore the nearby interstellar medium and its interaction with our solar system. In the mission concept developed in 1999 by NASA's Interstellar Probe Science and Technology Definition Team, a 400-m diameter solar sail accelerates the spacecraft to ~15 AU/year. This talk will summarizes the conceptual mission design and the technological challenges presented by this ambitious mission.

The sail is used to first bring the spacecraft in to 0.25 AU to increase the radiation pressure before heading out in the interstellar upwind direction. After jettisoning the sail at approximately 5 AU, the spacecraft coasts to 200-400 AU, exploring the Kuiper Belt, the boundaries of the heliosphere, and the nearby interstellar medium. Solar sail propulsion was selected for this mission because of the recent dramatic advances in solar sail materials development. The ISP mission plan is predicated on the successful development of solar sail materials as well as other solar sail technologies such as packaging and control. This talk will summarizes the conceptual mission design and the technological challenges presented by this ambitious mission.

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8.1 Modern Heliospheric Spacecraft
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